epiTRENDS

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Perinatal Hepatitis B Prevention in Washington State

The Centers for Disease Control and Prevention (CDC) estimate that, from 2002 through 2007, more than 350,000 new hepatitis B virus (HBV) infections occurred in the United States.

Discussion Points

Here are four discussion points related to the public health response for preventing perinatal hepatitis B transmission. The answers are contained in the text, or you may refer to the answers at the end of this article.

1. There are four basic recommendations for reducing perinatal transmission of HBV among babies born to women with chronic HBV infections. What are they?
2. What are two long-term medical outcomes of chronic HBV infection? Are the risks for infected neonates greater, less, or about the same as adults who get infected?
3. What is the significance of "hepatitis B surface antigen-positive" (HBsAg) and "anti-HBs antibody-positive"?
4. What challenges remain in the prevention of perinatal hepatitis B transmission?

The virus is spread by person-to-person transmission through blood and sexual fluids, including perinatally from woman to infant. Because chronic HBV infection can cause liver cancer and cirrhosis in roughly 25% of cases and is the primary cause of 3,000 deaths per year in the United States, it is a significant national health problem.

Over the past two decades, the number of United States children born to women with chronic HBV infection has increased primarily due to the increased number of foreign-born women of childbearing age.

Administration of both the first HBV vaccine dose and hepatitis B immune globulin within 12 hours of birth will prevent infection in almost all exposed infants. Without these post-exposure treatments, roughly 90% of infants born to HBV-infected mothers develop chronic HBV infection and about 25% of those will eventually die from chronic liver disease.

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Prevention Program

Many women chronically infected with HBV, as demonstrated by the presence of hepatitis B surface antigen (HBsAg), are unaware of their infections. Without intervention, HBV infections can be perinatally transmitted in up to 90% of pregnancies in HBsAg-positive women. While only about 10% of adults with acute HBV infection develop chronic infections, 90% or more of neonates infected at birth will develop chronic hepatitis with the risk of eventual liver failure or liver cancer.

In some geographic regions where the prevalence of HBsAg positivity exceeds 10%, perinatal transmission accounts for about 40% of cases. These include many countries in Asia, particularly Laos, Cambodia, Vietnam, and China, as well as some countries in sub-Saharan Africa. As a result, female immigrants and refugees coming to Washington State from these regions may have undetected chronic infections. Women who shared injection drug equipment are also at risk.

Washington State Department of Health's Perinatal Hepatitis B Prevention Program (PHBPP) aims to prevent the perinatal spread of hepatitis B based on CDC's 2005 guidelines to reduce HBV transmission. One important component is for local health jurisdictions to assist delivery hospitals in developing policies and case management programs for HBsAg-positive pregnant women and treatment protocols for their babies.

Specific recommendations include:

- Routine screening of all pregnant women for HBsAg prenatally or at the time of delivery and reporting of all positive results to public health agencies,
- Routine post-exposure immunoprophylaxis with hepatitis B immune globulin (HBIG) of babies born to HBsAg-positive women,
- Routine administration of the first of three doses of HBV vaccine to all babies born to HbsAg-positive women, and
- Routine post-prevention screening of vaccinated babies born to HBsAg-positive women for immunity (i.e., presence of anti-HBs antibody).

Local health jurisdictions should report each pregnancy in an HBsAg-positive woman and her contacts (including babies, sexual and household contacts) through the state's Perinatal Hepatitis B Surveillance Module in CHILD Profile. This online case management system generates reminders to assist investigation, reporting, and surveillance of each affected family. The state program coordinator evaluates the effectiveness of the PHBPP program statewide through annual summary data, which are also submitted to CDC for inclusion in national surveillance data.

Measuring the completeness of this surveillance is an important metric for this program. Based on CDC national estimates or on birth certificate studies, a minimum expected number of pregnancies in HBsAg-positive women is estimated. Unfortunately, of the roughly 550-750 HBsAg-positive women estimated to be pregnant each year in Washington, only about half (Table 1) are reported through PHBPP.

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In 2008, a large proportion of reported infants born to HBsAg-positive women received correct and timely post-exposure prevention at birth. Of 372 infants reported, 367 (99%) infants received HBIG and their first hepatitis B vaccine dose within 1 day of birth. Of babies receiving both HBIG and vaccine at birth, only 71% had a complete vaccine series reported by 6-8 months of age. In addition to improved reporting, completion of a three vaccine dose series should be a priority for those caring for these infants.

Prevention is highly effective. In 2007 and 2008, there were no known cases of children born to HBsAg-positive mothers in Washington State who then developed HBV infection after receiving HBIG and three doses of vaccine.

Table 1. Number of neonates born to HBsAg-positive women and reported to PHBPP and the number completing treatment to prevent chronic infection, 2005-2008.

Measurement for Washington State	2005	2006	2007	2008
Live births	82,625	86,845	88,921	90,270
Infants born to HBsAg-positive pregnant women and reported to PHBPP	317	377	325	372
Infants receiving HBIG and vaccine dose 1 within 1 day of birth	303 (96%)	370 (98%)	318 (98%)	367 (99%)
Infants receiving HBIG and 3 doses of hepatitis B vaccine **by 6-8 months of age**	248 (78%)	310 (82%)	224 (69%)	262 (71%)
Infants receiving HBIG and 3 doses of hepatitis B vaccine **by 12 months of age**	281 (89%)	332 (88%)	277 (85%)	317 (85%)
Infants receiving HBIG and 3 doses of hepatitis B vaccine and testing anti-HBs positive (immune)	166 (52%)	205 (54%)	170 (52%)	185 (50%)

Summary

In summary, a large proportion of neonates born to HBsAg-positive pregnant women reported to the Department of Health receive appropriate treatment at birth. However, estimates suggest that up to half of HBsAg-positive pregnant women may not be screened or reported. In addition, up to half of treated infants are not subsequently tested to demonstrate immunity to HBV. As a result, it is estimated that only a quarter of potentially infected infants have documentation of complete treatment and subsequent anti-HBs status. Therefore, it is likely that at least some children continue to be born in Washington State infected with hepatitis B perinatally but not identified. The majority of reported HBsAg-positive pregnant women are Asian, but specific information about countries of origin is not consistently available so that target populations for intervention are not well defined.

Breaking the cycle of perinatal hepatitis B infection means health care and public health workers should jointly identify pregnant women who are infected and ensure proper treatment of their infants. Every pregnancy should have a hepatitis B test documented and reported to PHBPP. Health care providers should review all reported hepatitis B tests on women 12-40 years of age to determine their pregnancy status. Since almost all perinatal hepatitis B infections are asymptomatic, it is essential that health care providers test all exposed infants after treatment (6 months of age or older) to identify and report infections. This will allow public health officials to identify lapses in post-exposure prevention in order to eliminate or treatment failures, and to improve interventions to prevent perinatal hepatitis B transmission.

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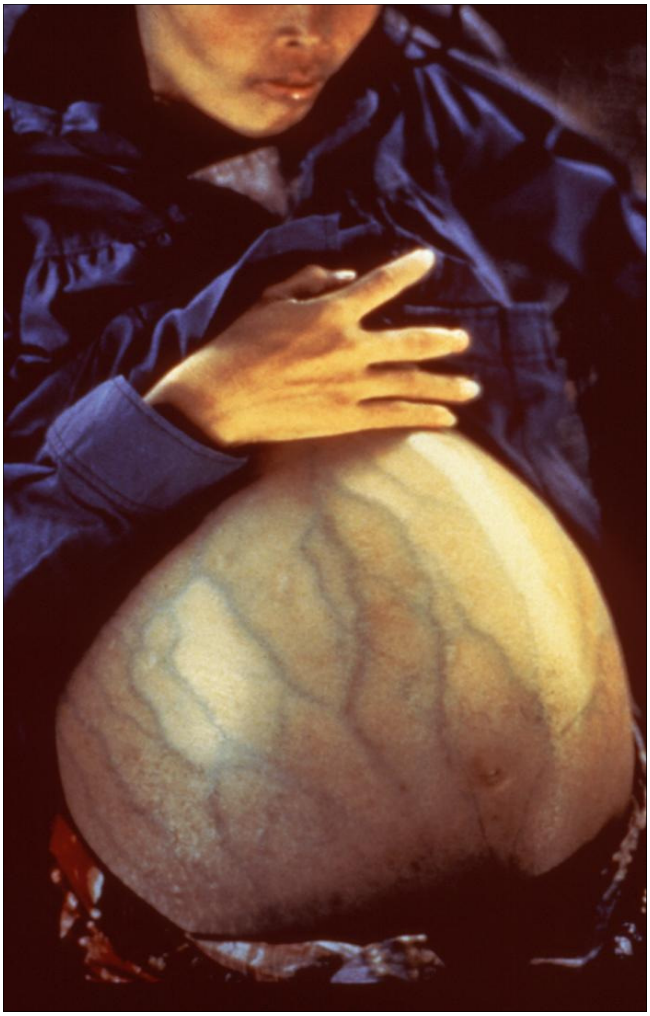
Answers to Public Health Discussion Questions

Answers to four discussion points related to the public health response for preventing perinatal hepatitis B transmission.

1. The four recommendations are:
   a. Screen all pregnant women for (HBsAg) prenatally or at the time of delivery,
   b. Give hepatitis B immune globulin (HBIG) to babies born to HBsAg-positive women,
   c. At birth, give the first of three doses of hepatitis B vaccine to to all babies born to HBsAg-positive women, and
   d. Check vaccinated babies born to HBsAg-positive women for immunity to HBV.

Timely and appropriate prophylaxis can prevent almost all perinatal infections.

2. Approximately 90% of babies with perinatal HBV infections develop chronic HBV infections. This is greater than the risk of developing chronic infection in older children and adults. As a result, perinatal infections account for a disproportionate number of cases of the two predominant long-term medical sequelae -- cirrhosis or hepatocellular carcinoma.



Distended abdomen in female patient with hepatoma resulting from chronic hepatitis B infection.
The incidence of hepatocellular carcinoma (HCC) is 12 - 300 times greater in patients with hepatitis B infection.

Photo courtesy of CDC: Patricia Walker, MD, Regions Hospital, MN

3. HBsAg-positive means that HBV is present and the person is infected. Anti-HBs-positive means that the person is immune to HBV due to vaccination or resolved infection. Vaccinated neonates born to HBsAg-positive women should be checked to see if they have anti-HBs antibody between the ages of 6 and 9 months.

4. Due to incomplete ascertainment and reporting, it is estimated that less than half of potentially exposed infants are identified by surveillance. Additional surveillance efforts are also needed to identify specific high risk groups in Washington State with inadequate prenatal screening, with an eventual goal of reaching out to improve testing and reporting for preventing perinatal hepatitis B transmission.

For further information about the Washington State Department of Health's Perinatal Hepatitis B Prevention Program, contact primary author Shana Johnny at shana.johnny@doh.wa.gov, 360-236-3698, or visit the program's website at http://www.doh.wa.gov/cfh/Immunize/diseases/hepatitis_b/hep-b-perinatal.htm